CLAIMS

1. A hydrodynamic bearing comprising:

(a) a cabinet including a base and a cover;

(b) a fixed shaft including a first end having a mounting part fixed on one of said base and said cover, and a second end at the opposite side of said fixed shaft;

(c) a flange in an annular shape, with said second end of said fixed shaft inserted into its inside, and fixed on said second end of said fixed shaft, thereby being substantially perpendicular to the axial direction of said fixed shaft;

(d) a sleeve, when said fixed shaft is inserted into its inside, allowed to revolve around said fixed shaft and placed where a hollow provided on an inner surface of said sleeve is in the vicinity of a surface of said flange;

(e) a thrust plate in an annular shape and fixed on one of opening ends of said sleeve, thereby being placed close to said flange when said second end of said fixed shaft is inserted inside said thrust plate; and

(f) a lubricant with which the whole of radial dynamic pressure grooves provided at least one of a side of said fixed shaft and an inner surface of said sleeve, and the whole of thrust dynamic pressure grooves provided at least one of a surface of said flange, a surface of said hollow of said sleeve, and a surface of said thrust plate, are filled and covered;

wherein:

(g) a circulation hole connecting spaces over and under said flange to each other is provided, and said lubricant circulates on surfaces of said flange through said circulation hole; and

(h) a vent connecting spaces around the joint between said fixed shaft and said flange to each other is provided.

2. A hydrodynamic bearing according to Claim 1 wherein said circulation hole is provided in said flange and said vent is provided inside said fixed shaft.

3. A hydrodynamic bearing according to Claim 1, wherein said circulation hole is provided in said flange and said vent is a vertical groove provided on at least one of a side of said fixed shaft and a side of said flange.

4. A hydrodynamic bearing according to Claim 1, wherein said circulation hole is a vertical groove provided on at least one of a side of said fixed shaft and a side of said flange and said vent is provided inside said fixed shaft.

5. A hydrodynamic bearing according to Claim 1, wherein inequalities A>B>C hold, where A is a distance in the radial direction of said fixed shaft between said fixed shaft and said thrust plate, B is a distance in the axial direction of said fixed shaft between an inner radius of said thrust plate and said flange, and C is a distance in the axial direction of said fixed shaft between said thrust plate and said flange over said thrust dynamic pressure grooves and their vicinity.

6. A hydrodynamic bearing according to Claim 1, wherein inequalities B>D and F>D hold, where B is a distance in the axial direction of said fixed shaft between an inner radius of said thrust plate and said flange, F is a distance in the axial direction of said fixed shaft between an inner radius of said flange and said hollow of said sleeve, and D is a distance in the radial direction of said fixed shaft between said flange and said hollows of said sleeve.

7. A hydrodynamic bearing according to Claim 1, wherein inequalities N<M<P hold when said radial dynamic pressure grooves are provided in two separated regions, a first region near said flange and a second region near said mounting part of said fixed shaft, where N is a distance in the radial direction of said fixed shaft between said fixed shaft and said sleeve in said second region, M is said distance in a region adjacent to a side of said second region near said flange, and P is said distance at an opening of said sleeve near said mounting part of said fixed shaft.

8. A hydrodynamic bearing according to Claim 1, wherein inequalities J<K<L and N<M<L hold when said radial dynamic pressure grooves are provided in two separated regions, a first region near said flange and a second region near said mounting part of said fixed shaft, where J is a distance in the radial direction of said fixed shaft between said fixed shaft and said sleeve in said first region, K is said distance in a region adjacent to a side of said first region near said second region, L is said distance in an

intermediate region between said first region and said second region, M is said distance in a region adjacent to a side of said second region near said first region, and N is said distance in said second region.

9. A hydrodynamic bearing according to Claim 1, wherein an inequality L<P holds when said radial dynamic pressure grooves are provided in two separated regions, a first region near said flange and a second region near said mounting part of said fixed shaft, where L is a distance in the radial direction of said fixed shaft between said fixed shaft and said sleeve in an intermediate region between said first region and said second region, and P is said distance at an opening of said sleeve near said mounting part of said fixed shaft.

10. A disk recording/reproducing apparatus comprising:

(a) a cabinet including a base and a cover;

(b) a hydrodynamic bearing comprising:

(i) a fixed shaft including a first end having a mounting part fixed on one of said base and said cover, and a second end at the opposite side of said fixed shaft;

(ii) a flange in an annular shape, with said second end of said fixed shaft inserted into its inside, and fixed on said second end of said fixed shaft, thereby being substantially perpendicular to the axial direction of said fixed shaft;

(iii) a sleeve, when said fixed shaft is inserted into

its inside, allowed to revolve around said fixed shaft and placed where a hollow provided on an inner surface of said sleeve is in the vicinity of a surface of said flange;

(iv) a thrust plate in an annular shape and fixed on one of opening ends of said sleeve, thereby being placed close to said flange when said second end of said fixed shaft is inserted inside said thrust plate; and

(v) a lubricant with which the whole of radial dynamic pressure grooves provided at least one of a side of said fixed shaft and an inner surface of said sleeve, and the whole of thrust dynamic pressure grooves provided at least one of a surface of said flange, and a surface of said hollow of said sleeve, and a surface of said thrust plate, are filled and covered;

wherein:

(vi) a circulation hole connecting spaces over and under said flange to each other is provided, and said lubricant circulates on surfaces of said flange through said circulation hole; and

(vii) a vent connecting spaces around the joint between said fixed shaft and said flange to each other is provided;

(c) a hub concentrically integrated with said sleeve;

(d) a motor installed between said cabinet and said hub, including a magnet and a coil, and for exerting to said hub a torque for a revolution around said fixed shaft;

(e) a magnetic disk concentrically fixed on said hub; and

(f) a head, when said magnetic disk revolves because of said torque, being placed close to a surface of said magnetic disk, recording a signal onto said magnetic disk, and reproducing a signal from said magnetic disk.